FLIGHT OF MIGRATING BIRDS.

By

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This has proved a bone of contention among naturalists for many years and though much has been done, of late, in discovering various details with regard to the flight of birds during migration, there still remains an enormous amount yet to be done.

Varied opinions have been given as to the speed, and the height above sea level, at which the bulk of birds fly. In the "Ibis" (the Journal of the British Ornithologist's Union) for October 1920, Col. R. Meinertzhagen dealt with both speed and altitude attained by migrants during their spring and autumnal flights, and he had the advantage of bringing into use aircraft, and aircraft instruments, for testing both height and speed. The conclusions drawn from a most interesting and instructive paper, by him, are as follows:—

"1. Birds need not, for the purpose of migration, ascend much beyond 5,000 ft. above the level of the earth, nor indeed do they.

2. Birds met with above 5,000 ft. are the exception and not the rule.

3. That nocturnal flight need not be higher than diurnal, and that, in fact, it is not.

4. That the bulk of migratory flight is conducted below 3,000 feet whether by day or night.

5. That under normal conditions, different species travel at different altitudes, some very low and some invariably high, but that during abnormal weather conditions, all birds are apt to fly low.

6. That during migratory flight, birds prefer to descend below cloud level, though this is not always the case. Exceptions probably occur when gaps occur in a cloud-bank, or where islands of land continue to be visible beyond or above the cloud area."

With regard to the effect of altitude on the flight of birds, Col. Meinertzhagen says:—"As regards an oft-voiced view that greater altitude makes flight easier for a bird, I can only quote the experience of our Royal Air Force, that as altitude increases, the machine has greater difficulty in maintaining its height and speed."

Again, in the "Ibis" of April 1921, page 228, Col. Meinertzhagen, in a paper on the "Velocity of Migratory Flight among Birds," says:—

"Moreover birds would experience greater difficulties in flying in the "more elevated layers of the atmosphere," as the atmosphere is rarer and therefore offers a less suitable mixture on which their wings can beat. They would experience the same difficulties as a man trying to swim in froth."

So much for Col. Meinertzhagen's opinions, which are based on a considerable amount of personal observation and a careful study of the experiences of other naturalists, and command attention.

The "Fishing Gazette" of 12th August 1922, quotes from the "Living Age", a popular lecture delivered by Professor J. Arthur Thomson, in which the Professor "corrected erroneous beliefs in regard to the speed with which migrating birds fly" and the belief "that migrating birds travelled at great heights, going even as high as ten thousand feet above sea level, but when birds were released from flying machines at such a height it was found that they were *overpowered by the cold and the thinness of the atmosphere.* It now seems that cranes and geese, the highest flying birds, usually travel at about 3,000 ft. The highest bird so far observed from aircraft is a sky lark, which was encountered six thousand feet up."

The above italics are mine.

Whereas Col. Meinertzhagen keeps to *ground* level the eminent English biologist reduces the height at which birds travel to *sea* level as his basis for judging height, and gives cold and the thinness of atmosphere, as the reason for birds not exceeding three thousand feet, with the one exception of the lark found at 6,000 ft.

Both are however agreed that rarified atmosphere is an important factor in deciding the height at which birds must fly, but what, one would ask, is the extent of the rarification which effects birds ?

There is, for instance, a vast difference between the air intensity encountered at 10,000 ft. and that at 20,000 ft. above sea level.

According to Professor Thomson birds are overpowered by the cold and thinness of the atmosphere at 10,000 ft. Moreover, this is not the condition of any particular species, possibly an inhabitant of low levels, but of all birds in general, but if this is the case, what about the avifauna which inhabits the snow line of the Himalaya and spends at least six months of the year at altitudes from 12,000 to 15,000 ft. above sea level and periodically ascends considerably higher than this even ? Why is not this vast concourse of birds overpowered ? Had the Professor spent some time at high altitudes on the Himalaya before embarking on his popular lecture, and had he seen a large number of species varying in size from the Wren to the Himalayan Griffon or the Lämmergeyer, he would have pondered further on the problem he set out to lecture on.

So far as India is concerned, little or nothing is known of the migration which bi-annually takes place over the Himalayan region.

It has repeatedly been stated and, I think, is generally believed, that most migrants keep to the courses of main rivers, that is, to comparatively low levels, for by flying along the courses of rivers they avoid the intervening mountain ranges.

If this were the case a very large and important portion of the migration problem could be, and would have been by now, easily solved. For here we have the direct routes marked out for us, from the plains of India right up to, or, at least, within a few miles of their breeding grounds, and yet, oddly enough, it is of this section that we know least.

How many sportsmen and naturalists can remember seeing geese, for instance, migrating up or down any of our main rivers, say a couple of hundred miles above where the river debouches on to the plains ?

The Jhelum is an honourable exception, but here again the conditions are abnormal. The wide valley and the expanse of water on the Woolar Lake for instance affords ample food and rest.

Just below that point and where it enters the sandy beds (and with miles of cultivation on each side), flights of geese are of daily and common occurrence, during the winter months.

It has been my good fortune to spend nearly a quarter of a century in distant tracts of the Himalaya. On the Chenab, the Sutlej, the Beas and the Ganges, respectively, I have spent both summers and winters. Ducks and waders I have met with frequently, but geese and cranes very rarely indeed.

On the other hand, I spent several years in Bhadarwar, in the S. E. corner of Kashmir and on the borders of the Chamba State. Here, one of my favourite shooting haunts was a ridge running down from Kablass, a peak something over 14,000 ft. and I usually camped at about 10,000 to 12,000 ft. This was from 1897 to 1905. This was evidently on the direct line of flight of migrating geese and I have seen and heard great skeins of them passing over from evening to morning day after day during the autumn. Some passed within a few hundred feet of my camp and others again could only just be seen or heard.

Now where did these birds come from ? Presumably the Tso Morari Lake, where they are known to breed in great numbers.

Thence, to India, they have three distinct courses open to them.

1. The first, and easiest as regards altitude, would be to fly due north for about 30 miles or so and drop into the valley of the Indus and come down that the whole way. A long route but, except at the very beginning, comparatively low flying the whole way.

2. Either S., or S. W. to the Spiti River and down it to the Sutlej in Bushahr State, and along it to the plains. The due southern course would mean high flying for about 50 miles and then comparatively low, *i.e.*, about 11,000 ft. and steadily descending. The S. W. course would mean high flying (16,000 ft. and over) for well over a hundred miles, and then a drop into the sandy bed of the Sutlej on the borders of the Hoshiapur District.

3. Due W. either into the watershed of the Chandar-Bhaga and, along it to where the two rivers become the Chenab, to Akhnoor, or due W. the whole way. Along the Chandar-Bhaga they would meet with a few ranges in the first portion of their flight which would necessitate high flying and thereafter descend steadily with the river, but the due W. course the whole way would mean a succession of ranges one after another and a continued flight at an altitude of 15,000 to 18,000 ft. for close on to 150 miles, to the borders of Bhadarwar and thence a drop of 50 to 70 miles either on to the sandy tracts of the Chenab at Akhnoor, the Ravee below Madhopur, or the Beas below where it joins the Chakki.

Yet this was undoubtedly one of the main routes of migrating geese, or if not even a main route, a passage which many thousands went over annually.

Col. Meinertzhagen, referring to a note of mine which appeared in the B.N.H.S. Journal, Vol. XXV., p. 302, giving an instance of cranes or storks which I saw from 14,000 ft. flying at close on to 20,000 ft. above sea level, mentions this as an "important scrap of evidence from India." Since then I have seen two lots of cranes flying high over Dharmsala Cantt. One lot of, I think, 12 passed over the station and I watched them through glasses till they disappeared into space in the direction of the Daulah Dhar Range. Another lot, of only two, I noticed coming up the valley while I was encamped at a place called Triund, at an altitude of about 9,500 ft. It was a lovely morning in early May and I watched them for about 20 minutes. One appeared to be enticing the other to follow it over the main range.

It would repeatedly ring up to a considerable height, followed only half-heartedly by the other, and return to its companion, both calling loudly the while. The second would only rise to about 11,500 or 12,000 ft. and then begin to lose elevation, whereas the other, on two or three occasions went practically out of view, but had to return to encourage the other. Eventually they gave it up and I watched them descend right into the flooded rice fields far below, whence they had probably started.

If the courses of rivers had been migrating routes, hundreds of sportsmen must have noticed great skeins and "wedges" of geese and cranes at various times on their downward and upward journeys, and the fact that they have not been noticed goes far to show that the flights go over the mountain ranges, where it would be extremely easy for a man camped in one nallah to be oblivious of thousands of geese passing over a range a mile or so away.

How far birds, like aircraft, are actually effected, by "thin" air in so far as flight is concerned, it is hard to say, and without in any way doubting Col. Meinertzhagen's statement that birds in rarified atmosphere would experience the same difficulties as a man trying to swim in froth,it might be at least pointed out that thousands do it daily, and surely they would descend to lower elevations if they found it difficult. If one carefully watches birds such as Vultures, Lämmergeyers, Eagles, Crows, etc., whilst soaring at say 7,000 ft. above sea level and then climbs up to 12,000 or 14,000 ft. and watches them there, is there any difference, any greater exertion observable ?

If they found it as difficult to fly there as a man found it to swim in froth, surely more "wing work" would be noticed. More flapping and beating of the air to keep their elevation would be necessary. Personally, I have never been able to notice any difference, and the ease with which a Lämmergeyer or a Vulture quarters the rockey hill sides, or circles over the mountain ranges at 15,000 ft. *appears* in no way different to the same bird beating over the wooded ravines at 6,000 ft.

I have watched a Lämmergeyer breaking bones at close on to 14,000 ft. This necessitated his carrying up the bone to some 200 ft. or so above the ground, dropping it, and then coming down after the fragments, and again taking the unbroken part to repeat the process.

He was at this for the better part of an hour, and surely if he had found the operations more tiring, or more difficult of accomplishment, at 14,000 ft. than at say 7,000 ft. he would have taken his bone to a more congenial atmosphere, instead of struggling with it where he did.

If, again, such birds are not impeded by "thin" air why should migrants, such as geese, be ? If on the other hand they are not, then the obvious route for them from their breeding haunts would very naturally be the shortest and these are the direct ones across the intervening mountain ranges.

Col. Meinertzhagen gives three speed records of migrating geese, *viz.*, 44·3, 50¼, and 55 miles per hour, respectively, but if, for the sake of argument we reduce this to only 35 miles as an all round average, the actual duration of flight from Tso Morari to the plains would be in the vicinity of six to seven hours, which permits of a reasonable assumption that the whole journey is done in one long flight.

If the courses of rivers were followed each flight would run into hundreds of miles, necessitating, in all probability, one or more halts for rest and food. On most of our Punjab rivers there is no "suitable accommodation." The deep and narrow gorges alternating between cliffs and wooded or barren hill sides are not the places to tempt geese or cranes, where enemies could crawl up to within a few feet of a gaggle, and the wheat fields found in such localities might, with fortune, tempt half a dozen weary stragglers, but would not provide a night's food for a decent sized skein.